

answers

Chapter 3 Review Packet

1. A study of the effect of living in public housing on family stability and other variables in poverty-level households was carried out as follows:

The researchers obtained a list of all applicants for public housing during the previous year. Some applicants had been accepted, while housing authority had turned down the others. Both groups were interviewed and compared.

(a) Observational study or experiment? Why? *observational study - no treatment*

(b) Explanatory and response variables?

accepted into housing or not *family stability and other variables studied*

2. Researchers wanted to measure the percent increase in the body's metabolic rate and pulse after exercise. In a study of this effect, the people were asked to walk briskly on a treadmill for 1 hour. Their metabolic rates and pulses were measured before and immediately after, and the percent increase was then calculated. The researchers studied 120 people, both men and women.

(a) Observational study or experiment? *experiment → trt = wal*

(b) Explanatory and response variables?

walking *pulse and metabolic rate*

(c) What are the experimental units or subjects?

subjects - the people in the experiment

(d) What is the treatment?

walking briskly for 1 hour

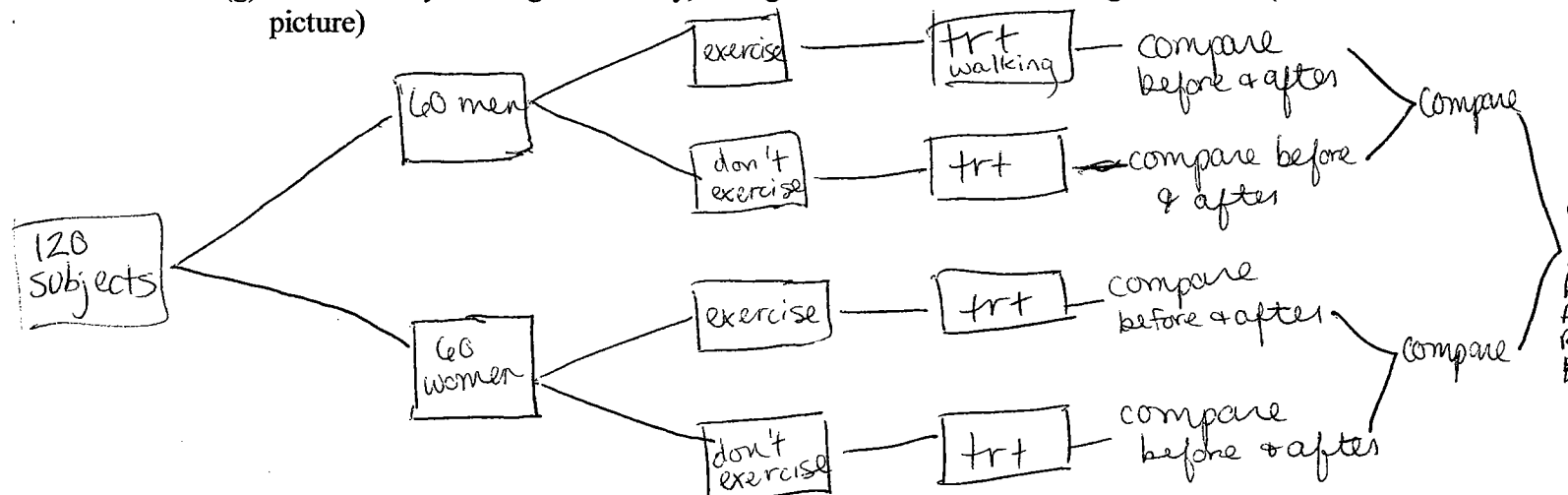
(e) What type of an Experimental Design is this?

could be blocked, then ~~randomized~~ comparative expt.

(f) What are the lurking variables, if any?

gender, health, age

(g) How would you design this study, taking into account all the lurking variables? (Draw a picture)



*assuming all subjects are similar age.

3. The following people (listed by last name) are selected by a good sampling method to be in a Randomized Comparative Experiment. We want to assign them to a treatment or a control group.

01 Wade	07 Card	13 Hill	19 Hill
02 Tapp	08 Hyman	14 Imoh	20 Lockart
03 Deitrich	09 Suggs	15 Lippa	21 Reynolds
04 Collins	10 Dunn	16 Martin	22 Beale
05 Brown	11 Mitnick	17 Berg	23 Moreland
06 Hall	12 Gray	18 Rogers	24 Jones

(a) Use the Table of Random Digits (starting at line 124)

trt
Deitrich Hyman
~~03~~ Hill Mitnick
Reynolds Jones
Moreland

control
Wade Hall
Lippa Hill
Rogers Suggs
Dunn

(b) Use your calculator

*answers will vary - use randInt(1, 24)

4. Is the right hand generally stronger than the left hand in right-handed people? You can crudely measure hand strength by placing a bathroom scale on a shelf with the end protruding, then squeezing the scale between the thumb (below) and the four fingers (above). The reading of the scale shows the force exerted. You use 15 right-handed people as subjects, all between the age of 20 and 30. You measure the difference between the two hand strengths (right hand - left hand strength, thus positive difference shows right hand stronger, negative difference shows left hand stronger)

(a) What are the explanatory and response variables?

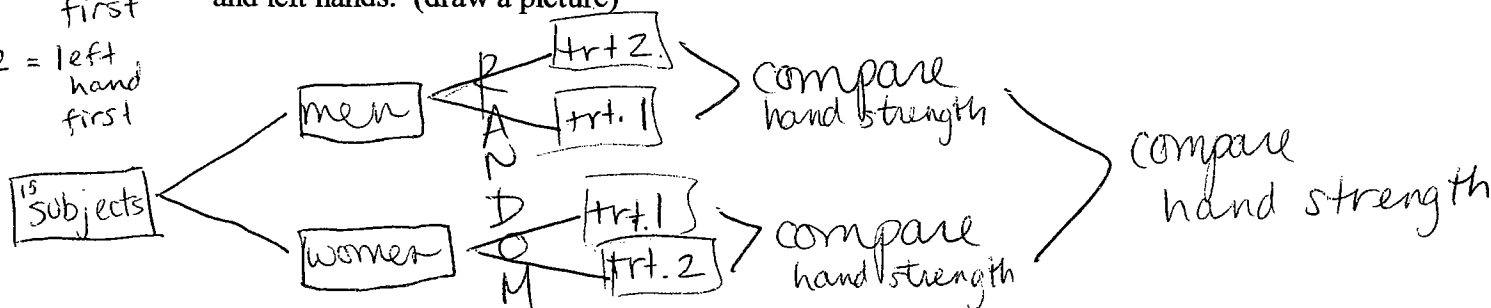
hand strength

(b) What are some lurking variables?

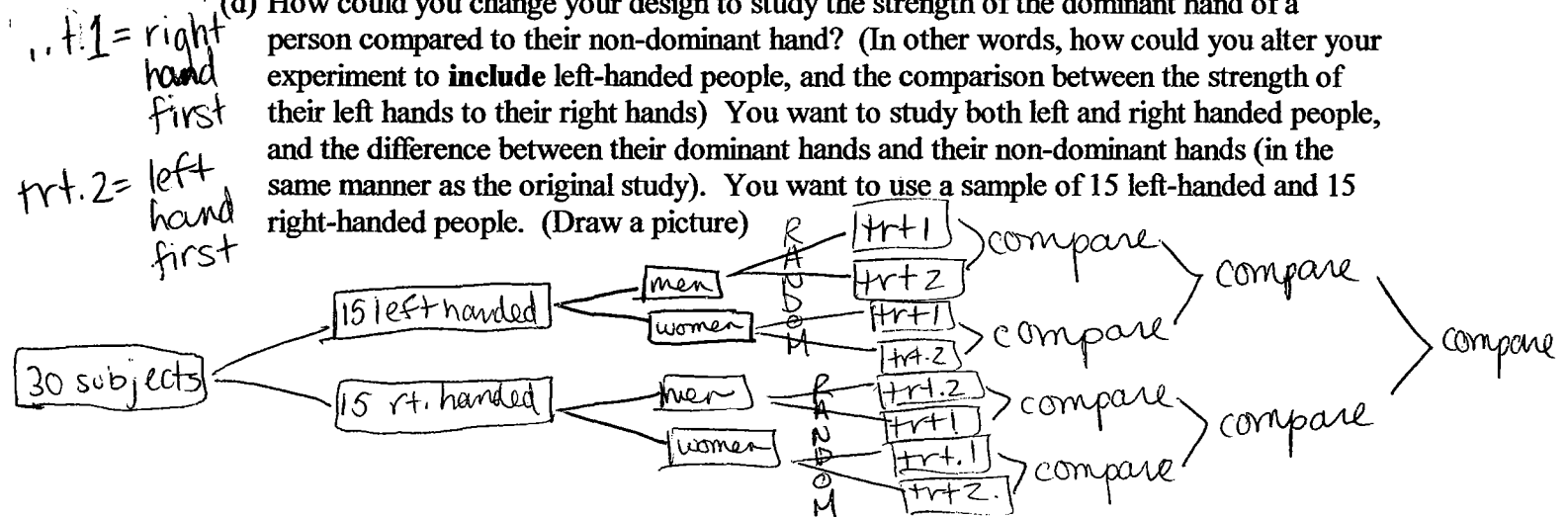
gender, health, strength in general

(c) Describe the design of a matched pairs experiment to compare the strength of the right and left hands. (draw a picture)

trt.1 = right hand first
trt.2 = left hand first



- (d) How could you change your design to study the strength of the dominant hand of a person compared to their non-dominant hand? (In other words, how could you alter your experiment to **include** left-handed people, and the comparison between the strength of their left hands to their right hands) You want to study both left and right handed people, and the difference between their dominant hands and their non-dominant hands (in the same manner as the original study). You want to use a sample of 15 left-handed and 15 right-handed people. (Draw a picture)



- (e) Lastly, how could you take into account the lurking variable of age? Describe (and draw a diagram of) your experiment.

*block with age first (25-30, 20-25)
then carry out like in (a) and (b)

5. In using Table B repeatedly to choose samples or do experimental randomization, you should not always begin at the same place, such as line 101. Why not?

You wouldn't always have the same chance of selecting an exp. unit.

6. A newspaper article about an opinion poll says "43% of Americans approve of the President's overall job performance during his term in office." Toward the end of the article you read: "The poll is based on unbiased telephone interviews with 1210 adults from around the United States, excluding Alaska and Hawaii. The adults were selected at random from a list of registered voters who listed their telephone numbers on their registration"

- (a) What is the population? The sample?

- (b) Discuss the problems with this sample survey. Also, what improvements would you make?

Americans 1210 adults

- only those w/ telephones
- excludes Alaska + Hawaii
- only registered voters who listed phone numbers
- only adults
- nonresponse

- not do phone interviews

7. A researcher wants to sample high schools in the United States. He is looking to determine the average weekly income and curfew for high school students. He decides that the grade that the students are in will have a large effect on their responses and he wants to take this into account. He obtains a list from the government of all certified high schools in the country (private and public). How would you create an appropriate sample for him to analyze? (Use both stratified and multistage sampling methods)

- Pick an SRS out of all the high schools
- In those high schools; stratify into grades.
- Take an SRS of students in each grade.

8. A management student takes a survey of student attitudes toward part-time work while attending college. He asks a large group of randomly selected students from numerous colleges and finds that 67% of them have a positive attitude toward part-time work while attending college. Is this a parameter or a statistic?

Statistic

9. Do question 3.55 on page 277

* answer in back of book

10. A student does an experiment to find out the proportion of red M&M's in a bag. He takes 100 bags, opens them, and counts the red M&Ms. He then counts the total number of M&Ms in the bag, and finds the percent of M&Ms that are red. When he creates a sampling distribution from his sample proportions, the center (mean) is approximately 34.67%. Suggest a value for the population parameter (p) of red M&Ms in any given bag such that his statistic (\hat{p}) is an unbiased estimator.

~34-35% would
be acceptable